

SECTION III—REMARKS

This amendment is submitted in response to the Office Action mailed September 10, 2004. No claims are amended herein, and claims 1-22 and 34-44 remain pending in the application. Applicants respectfully request reconsideration of the application and allowance of all pending claims in view of the above amendments and the following remarks.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 1-22 and 34-44 under 35 U.S.C § 103(a) as obvious in view of, and therefore unpatentable over, U.S. Patent No. 6,780,772 to Uzoh *et al.* (“Uzoh”) in view of U.S. Patent No. 6,739,953 to Berman *et al.* (“Berman”). Applicants respectfully traverse the Examiner’s rejections. To establish a *prima facie* case of obviousness, three criteria must be met: (1) the prior art references must teach or suggest all the claim limitations; (2) some suggestion or motivation to combine the references must be found in the prior art; and (3) there must be a reasonable expectation of success. MPEP § 2143. As explained below, Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness.

Claim 1 recites a process combination including providing a wafer, the wafer comprising an inter-layer dielectric (ILD) having a feature therein, an under-layer deposited on the ILD, a barrier layer deposited on the under-layer and a conductive layer deposited on the barrier layer; exposing the barrier layer; placing the wafer in an electrolyte, such that at least the barrier layer is immersed in the electrolyte; and “applying an electrical potential between the wafer and an electrode immersed in the electrolyte until at least part of the barrier layer is removed.” According to the Examiner, Uzoh discloses substantially all the elements and limitations of the claim except for the explicit details of the electropolishing process. The Examiner asserts that Berman discloses these details, and that it would have been obvious at the time the present invention was made to combine Uzoh and Berman to arrive at the present invention.

Applicants respectfully disagree. First, both Uzoh and Berman disclose wafers including a barrier layer deposited directly on the dielectric layer and a seed metal layer deposited on the barrier layer. Uzoh and Berman, taken together, therefore cannot disclose a combination including providing a wafer, “the wafer comprising an inter-layer dielectric (ILD) having a feature therein, an under-layer deposited on the ILD, a barrier layer deposited on the under-layer and a conductive layer deposited on the barrier layer.” Second, Berman does not, as the

Examiner claims, disclose the details of the claimed electropolishing process. Specifically, Berman uses an electrolytic and abrasive slurry held between a polishing pad and a wafer to electropolish that portion of the wafer in contact with the pad and the slurry. Berman does not disclose that the wafer is placed in an electrolyte. Uzoh and Berman, taken together, therefore cannot disclose, teach or suggest a combination including “placing the wafer in an electrolyte, such that at least the barrier layer is immersed in the electrolyte.” For the above reasons, Applicants submit that Uzoh and Berman cannot obviate the claim. Applicants therefore respectfully request withdrawal of the rejection and allowance of the claim.

Regarding claims 2-11, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 1 is in condition for allowance. Applicants submit that claims 2-11 are therefore also allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

Claim 12 recites a process combination including providing a wafer, the wafer comprising an inter-layer dielectric (ILD) having a feature therein, an under-layer deposited on the ILD, and a barrier layer deposited on the under-layer, and a conductive layer deposited in the feature; placing the wafer in an electrolyte, such that at least the barrier layer is immersed in the electrolyte; and “applying an electrical potential between the wafer and an electrode immersed in the electrolyte until at least part of the barrier layer is removed.” By analogy to the discussion above for claim 1, Uzoh and Berman, when combined, do not disclose, teach or suggest a combination including “applying an electrical potential between the wafer and an electrode immersed in the electrolyte until at least part of the barrier layer is removed.” Applicants submit that Uzoh and Berman therefore cannot obviate claim 12 and respectfully request withdrawal of the rejection and allowance of the claim.

Regarding claims 13-22, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 12 is in condition for allowance. Applicants submit that claims 13-22 are therefore also allowable by virtue of their dependence on an

allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

Claim 34 recites a process combination including providing a wafer, the wafer comprising an inter-layer dielectric (ILD) having a feature therein, an under-layer deposited on the ILD, a barrier layer deposited on the under-layer and a conductive layer deposited on the barrier layer; exposing the barrier layer; and “electrolytically removing at least part of the barrier layer.” By analogy to the discussion above for claim 1, Uzoh and Berman, when combined, do not disclose, teach or suggest a combination including “electrolytically removing at least part of the barrier layer.” Applicants submit that Uzoh and Berman therefore cannot obviate claim 34, and respectfully request withdrawal of the rejection and allowance of the claim.

Regarding claims 35-44, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 34 is in condition for allowance. Applicants submit that claims 35-44 are therefore also allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

Conclusion

Given the above amendments and accompanying remarks, all claims pending in the application are in condition for allowance. If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to allowance of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 12-10-04



Todd M. Becker
Attorney for Applicant(s)
Registration No. 43,487

Blakely, Sokoloff, Taylor & Zafman LLP
12400 Wilshire Boulevard, Seventh Floor
Los Angeles CA 90025-1030
Phone: 206-292-8600
Facsimile: 206-292-8606

Enclosures: Postcard
Amendment transmittal, in duplicate